

FIG. 1

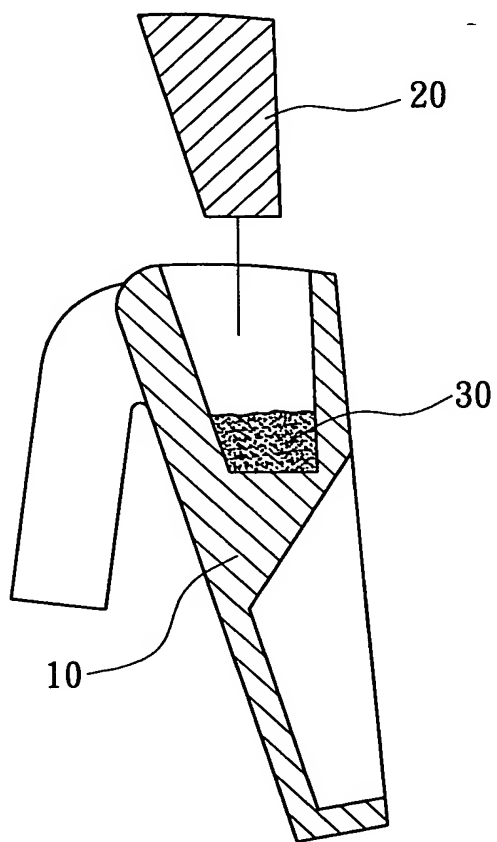


FIG. 2

metallic filler (wt%)	Processing time	800°C	830°C	850°C	900°C	1000°C	1050°C	1100°C
100Ag	30sec					○/△	○/△	○
	120sec					○/△	○/△	○
	300sec					○/△	○/△	○
72Ag- 28Cu	30sec	○		○	○/△			
	120sec	○/△		○/△	○/△			
	300sec	○/△		○/△	○/△			
95Ag-5Al	30sec		○	○	○			
	120sec		○	○/△	○/△			
	300sec		○/△	○/△	○/△			

* preheating: 500°C×90sec

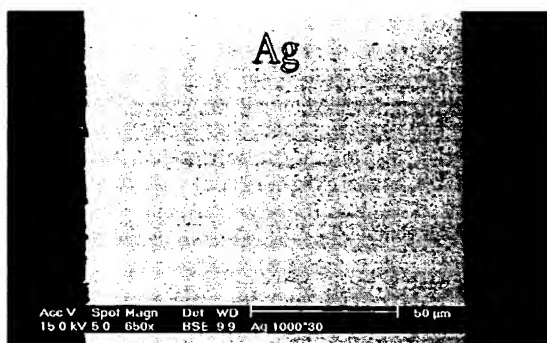
**heating speed: 900°C/min

***vacuum: $< 8 \times 10^{-5}$ torr

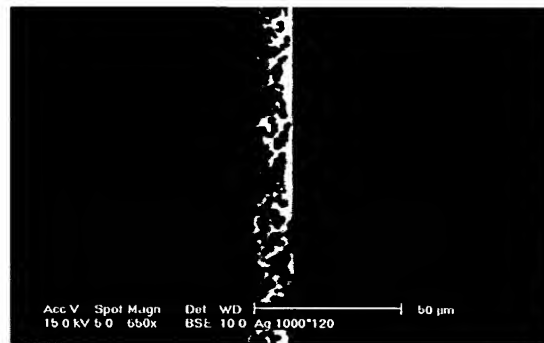
○ metallographic examination

△ shearing test

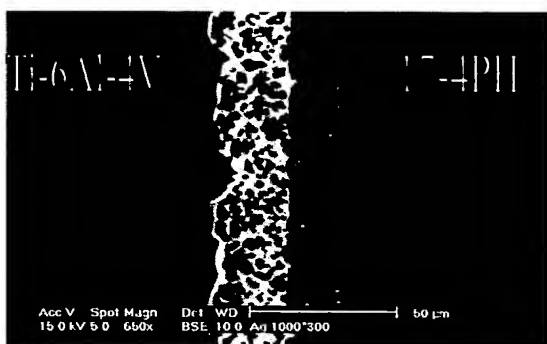
FIG. 3



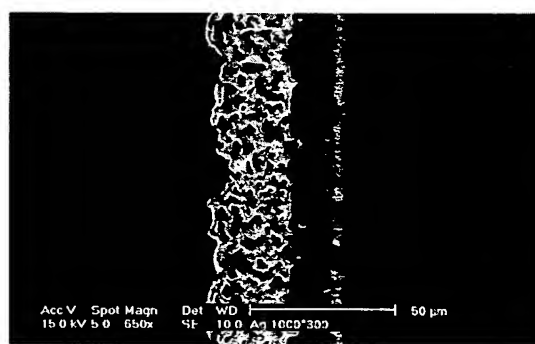
(a)



(b)



(c)

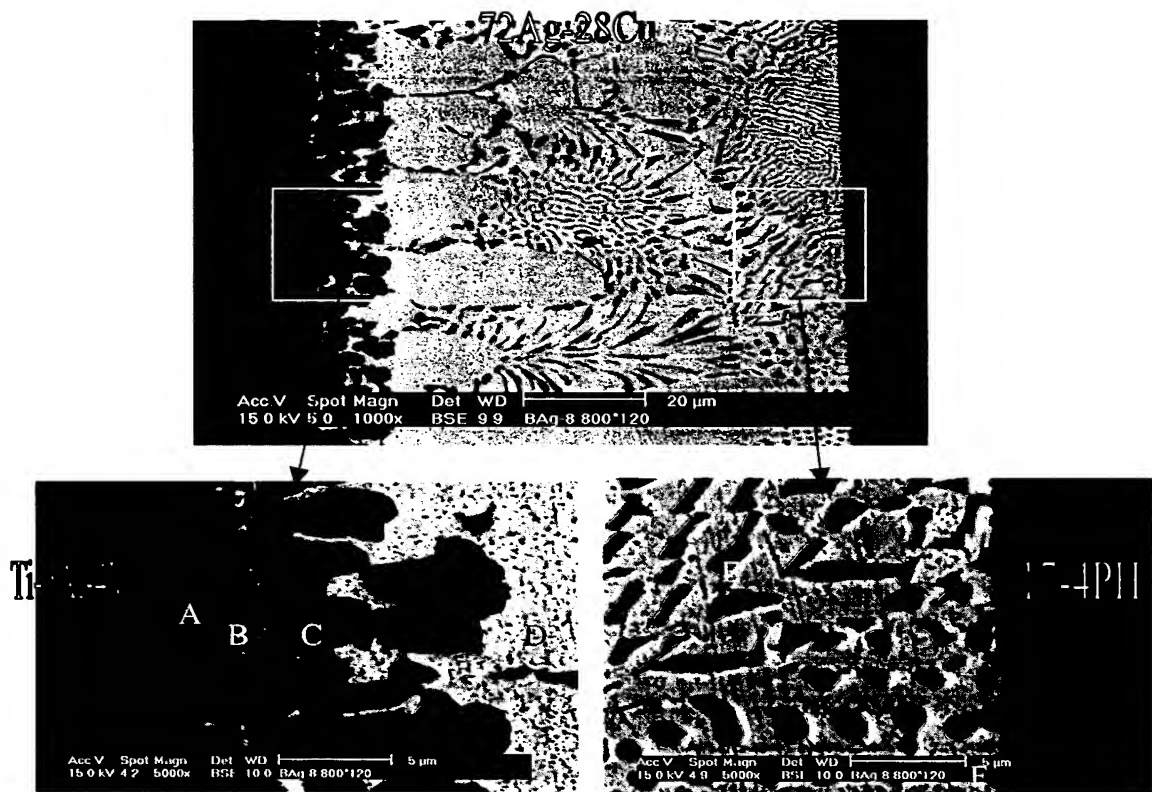


(d)

FIG. 4

metallic filler	temperature(°C)x time(sec)	loading (kgf)	sectional area(mm ²)	shearing stress (MPa)	average shearing stress (MPa)
100 Ag	1000x30	494	15*1.5	107.58	91.685
		348	15*1.5	75.79	
	1000x120	256	15*2	41.83	43.535
		277	15*2	45.24	
	1000x300	83	15*1.5	18.08	11.245
		27	15*2	4.41	
	1050x30	450	15*4	36.75	35.77
		213	15*2	34.79	
	1050x120	99	15*3	10.78	10.455
		93	15*3	10.13	
	1050x300	53	15*3	5.77	5.355
		88	15*3.5	4.94	

FIG. 5

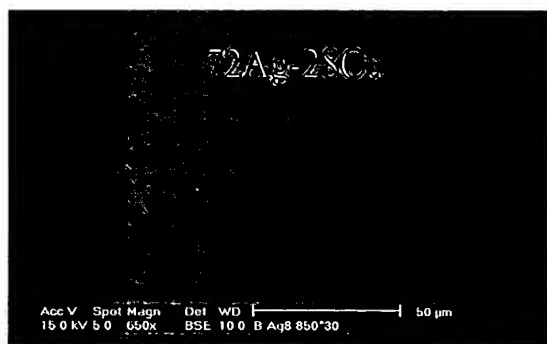


(a)

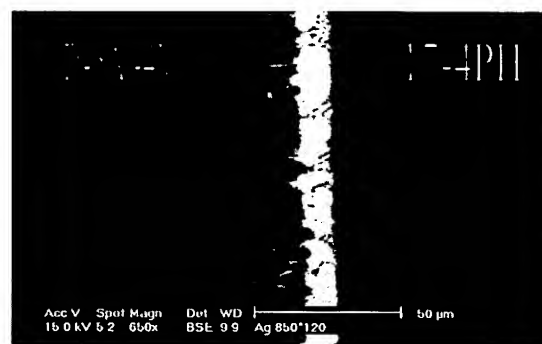
wt%	A	B	C	D	E	F
Ni	1.4	0.92	1.26	---	2.68	3.33
Fe	1.13	0.64	0.77	1.44	3.03	23.28
Cr	0.5	0.33	0.57	0.81	3.22	2.54
V	0.89	1.05	---	1.28	1.38	0.19
Ti	45.61	38.48	20.42	0.84	2.01	38.09
Ag	2.43	1.42	1.83	86.17	77.96	2.29
Al	2.36	2.37	1.06	1.95	2.27	1.04
Cu	45.6	54.79	74.08	7.51	7.45	29.23
Total	100	100	100	100	100	100
phase	TiCu	Ti ₂ Cu ₃	TiCu ₄	residual filler area of Ag	other trace solidus metal in Ag-Cu eutectic composition	thickness <1μm

(b)

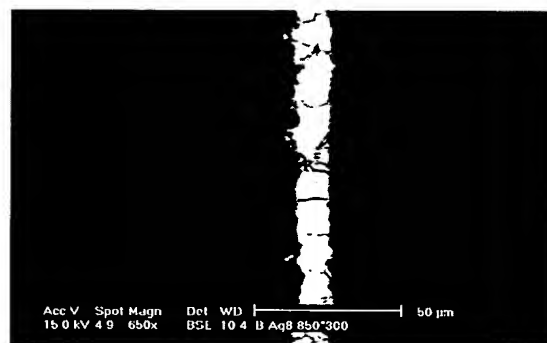
FIG. 6



(a)



(b)

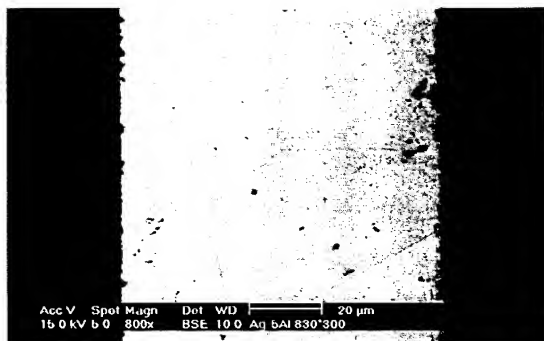


(c)

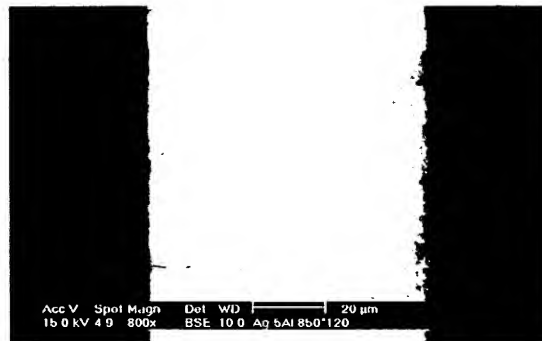
FIG. 7

metallic filler	temperature(°C)x time(sec)	loading (kgf)	sectional area(mm ²)	shearing stress (MPa)	average shearing stress (MPa)
72Ag-28Cu	800x120	407	15*1.5	88.63	96.42
		638	15*2	104.21	
	800x300	126	15*1.5	29.4	25.915
		103	15*1.5	22.43	
	850x120	401	15*2	65.5	68.195
		434	15*2	70.89	
	850x300	344	15*2	56.19	53.165
		307	15*2	50.14	
	900x30	203	15*1.5	44.21	46.495
		224	15*1.5	48.78	
	900x120	301	15*2.5	39.33	36.885
		369	15*3.5	34.44	
	900x300	209	15*3	22.76	21.725
		95	15*1.5	20.69	

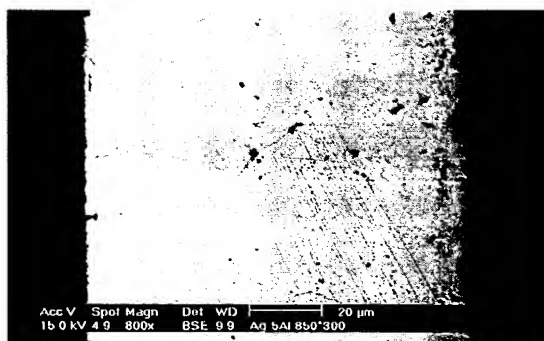
FIG. 8



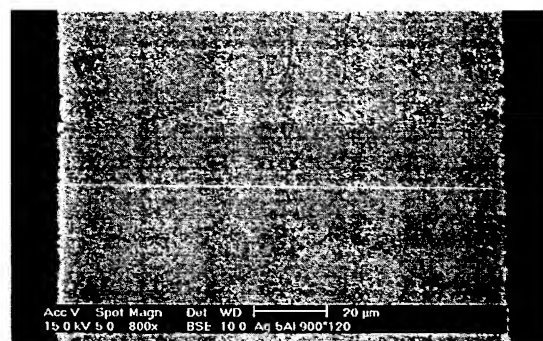
(a)



(b)



(c)



(d)

FIG. 9

metallic filler	temperature (°C)x time(sec)	loading (kgf)	sectional area(mm ²)	shearing stress (MPa)	average shearing stress (MPa)
Ag-5Al	830x300	390	15*1.5	84.93	86.455
		404	15*1.5	87.98	
	850x120	314	15*1.5	68.38	73.935
		365	15*1.5	79.49	
	850x300	323	15*2	52.76	51.315
		229	15*1.5	49.87	
	900x120	63	15*1.5	27.44	26.785
		160	15*2	26.13	
	900x300	39	15*1.5	8.49	8.49
		---	15*1.5	---	

FIG. 10